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## DEBITTERING SOYBEANS

## LIST OF PATENTS FOR REMOVING THE BITTER TASTE FROM SOYBEANS

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## U. S. PATENTS

- 1,314,298 August 26, 1919. Process of deodorizing and decoloring bean-flour.  
Yoshitaro Yamamoto.  
After hulls are removed beans are steeped in dilute vinegar solution at 60° C., washed, steeped in bicarbonate, washed, and dried.
- 1,433,168 October 24, 1922. Odorless and colorless soybean flour.  
Yoshitaro Yamamoto. C.A. 17:316  
Coarsely pulverized soybean material is treated with very dilute acetic acid to remove the odor and remove the color. The oil is then extracted from the bean material and ground to a flour.
- 1,509,076 September 16, 1924. Treatment of soybeans.  
Laszlo Berczeller.  
Subjection of soybeans to steam or saturated steam for a short time.
- 1,615,822 February 1, 1927. New food and process of production.  
Roland P. Baile.  
Beans are soaked in water, then immediately introduced into boiling peanut oil.
- \*1,799,256 April 7, 1931. Apparatus for treating soybeans.  
Teikichi Satow.  
Description of a drum type of equipment for removing the oil and baking the beans to improve their taste.
- 1,850,095 March 22, 1932. Extraction of oil from vegetable material.  
F. P. Dengler to Lloyd M. Brown.  
Beans are treated at 180° F. with dilute ammonia solution and superficially dried prior to the oil extraction.

<sup>1/</sup> One of the laboratories of the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture.

- 1,867,541 July 12, 1932. Process of manufacturing soybean flour.  
W. L. Shellabarger, assignor to Shellabarger Grain Products Company, Decatur, Illinois. C.A. 26:4657  
Process of treating beans with steam between 120° to 140° F. followed by a vacuum treatment at 24 inches of mercury.
- 1,870,450 August 9, 1932. Method for improving and removing the odor and/or flavor of legumes.  
L. W. Haas and H. O. Renner, assignors to J. R. Short Milling Company, Chicago, Illinois.  
The beans are reduced to a flour and treated with an aldehydic reducing agent such as formaldehyde.
- 1,896,520 February 7, 1933. Process for the manufacture of a disem-bittered product of wheat germ.  
Ernst Komm Dresden-Weisser. Hirsch, Germany.  
Wheat germs are mashed in an atmosphere of carbon dioxide and then subjected to steam distillation to remove the bitter principle.
- 1,896,521 February 7, 1933. Process for obtaining high-valued nutrient from the products of cereals and legumens.  
Ernst Komm, Dresden-Weisser. Hirsch, Germany.  
A method of producing a food product rich in vitasterenes and vitamins by mashing in water a grain byproduct rich in cellulose and bitter principle, adding a diastasic substance, and passing steam through the liquid at a controlled rate to prevent destruction of the vitamins.
- \*1,912,895 June 6, 1933. Process for converting soya beans and the like seeds into a condition suitable for nutrition.  
Fritz Güssel of Frankfort-on-the Main, Germany.  
Treatment of soybeans with oils at 100° C. for 5 minutes and the removal of excess oil with a centrifuge.
- 1,914,478 June 20, 1933. Bread-leavening composition.  
Michele Bonotto, assignor, to American Soya Products Corporation, Evansville, Indiana.  
Calcium and alkali phosphoproteinates are used with protein and yeast to leaven bread.
- \*1,936,281 November 21, 1933. Process for disem-bittering and improving soya beans or like legumes.  
E. C. Winkler and Hubert Goller, Vienna, Austria, assignors to American Soya Products Corporation, Evansville, Indiana.  
The soaking of beans in water at a pressure other than atmospheric and at a temperature between 65° and 80° C. During the process the seed coat acts as a semi-permeable membrane to remove undesirable constituents.

- 1,973,281 September 11, 1934. Process for making vegetable product. Michele Bonotto. C.A. 28:6880  
To improve color and taste, the beans are soaked in a solution of SO<sub>2</sub>, then heated and subjected to a current of steam to liberate the SO<sub>2</sub>.
- 1,980,838 November 13, 1934. Process for treating fat and oil-bearing seed products.  
G. P. Trussaud, assignor to Arnold R. Boyd, New York, New York. Treatment of oil-bearing seeds by a process which involves soaking them in water and heating the water-soaked seeds between 110° C. and 140° C. in the presence of sulfur dioxide.
- 2,000,317 May 7, 1935. Soybean flour.  
W. B. Bishop, assignor to A. E. Staley Manufacturing Company, Decatur, Illinois.  
Normal moisture content is increased; beans are subjected to high temperature and dried at reduced temperature. After oil is expelled, the beans are ground to flour.
- 2,026,676 January 7, 1936. Treatment of soybeans.  
L. O. Gill, assignor to A. E. Staley Manufacturing Company, Decatur, Illinois.  
The moisture content of beans or broken parts is increased to about 20 percent. Beans are heated at a temperature above the boiling point of water, and then dried at low temperatures.
- \*2,052,215 August 25, 1936. Process for producing a soya flour with changed flavor and the products thereof.  
Martin Cohn, assignor to M. Neufeld and Company, Berlin, Germany. Beans are soaked for about two hours at a temperature of about 75° C. in water weakly acidulated with hydrochloric, sulfuric, or phosphoric acids.
- 2,101,805 December 7, 1937. Process of treating leguminous materials. Michele Bonotto, assignor to American Soya Products Corporation, Evansville, Indiana. C.A. 32:1132  
To improve the color and taste of soybeans they are treated with a .02 percent to .25 percent solution of sulfur dioxide and washed in water.
- 2,086,180 July 6, 1937. Process for removing solvent from solvent-treated material.  
Michele Bonotto, Evansville, Indiana, assignor to American Soya Products Corporation, Evansville, Indiana.  
Live steam is passed through soybean flakes in a solvent extraction process to remove the solvent.



- 2,086,181 July 6, 1937. Apparatus for the continuous treatment of soybeans with sulfur dioxide solution.  
Michele Bonotto, assignor to American Soya Products Corporation, Evansville, Indiana. C.A. 31:5895  
The continuous treatment of soybeans with sulfur dioxide followed by water washing.
- 2,117,315 May 17, 1938. Treating soybeans.  
Fritz G<sup>u</sup>ssel, assignor to General Soya Corporation, New York, New York.  
Moisture content of the beans is adjusted to 10 to 15 percent; then beans are coated with oil and heated in a gaseous atmosphere to effect removal of objectionable constituents.
- 2,146,958 February 14, 1939. Process of removing objectionable smell or taste from flour or similar ground products.  
Alois Kotera, Prague, Czechoslovakia, assignor to Carob-Nont-Union Verwaltungs-Gesellschaft in b.H., Frankfort-on-the-Main, Germany.  
To improve taste and odor, food products are mixed with about .01 percent of finely divided activated carbon.
- 2,147,097 February 14, 1939. Improving the palatability of soybeans.  
A. A. Horvath, assignor to Soya Corporation of America, New York, New York. C.A. 33:3914  
Beans are subjected to a gas (CO<sub>2</sub>) at 1 to 60 atmospheric pressure and 0° to 40° C. The gas is expelled to improve flavor and taste.
- 2,148,142 February 21, 1939. Process of debittering soybeans.  
R. A. Wait, assignor to Spencer Kellog and Sons, Buffalo, New York. C.A. 33:3914  
Soybeans are treated in a drum with a combination of ethylene and steam diluted with carbon dioxide or nitrogen.
- \*2,172,699 September 12, 1939. Food production from oleaginous seeds such as soybeans.  
Martin Cohn. C.A. 34:542  
An apparatus and process are described for swelling the seeds in water and pressing them into skinlike films. This is done by forcing the seeds under pressure through a very narrow gap between heated, revolving surfaces, one of which retains the film until dry.
- 2,182,175 December 5, 1939. Method for the preparation of leguminous foodstuff.  
R. G. Gates, assignor to C. L. Wickersham, Sharpsburg, Pennsylvania.  
Beans are ground to flour, steamed and mixed with sugar materials and starchy products to make a precooked food product which is then shaped and toasted.

- 2,260,254 October 21, 1941. Process for making soybean products. N. F. Kruse and W. L. Soldner, assignors to Central Soya Company, Inc., Fort Wayne, Indiana. Moisture content of the meal is increased to between 15 and 30 percent, then beans are cooked at a temperature above the boiling point of water while the meal is kept in motion.
- 2,267,747 December 30, 1941. Dehulled, disembittered, and expanded soybeans and process for producing same. William J. Plews, Chicago, Illinois, assignor to Plews Process, Inc., New York. A puffed soybean is produced by treating it with a steam pressure between 50 and 300 lb./sq. in. and suddenly releasing the pressure.
- 2,316,458 July 12, 1940. Method of preparing soybeans. Oreste Scalise, New York, New York. Soybeans are processed by being soaked in a solution of sodium chloride and flavoring agent. They are then fried in hot oil until the moisture in the beans is 2 or 3 percent.
- 2,322,516 June 22, 1943. Fixation process. A. A. Horvath, assignor to Horvath Laboratories, Inc., Chambersburg, Pennsylvania. A method of fixing undesirable substances in the skin and germ of the whole soybean. The beans are treated with iron, calcium or magnesium salts until they penetrate the palisade layer and hilum. The treated soybeans are then heat-tempered.
- 2,329,080 September 7, 1943. Method of treating soybeans. Charles A. Raymond, Marion, Ohio. Beans are soaked in water, boiled in sodium bicarbonate, washed, soaked in ammonium bicarbonate 4 hours, heated to slightly above 212° F., and finally cooked in hot oil at 220° to 230° F.

#### BRITISH PATENTS

- 212 January 2, 1914. Deodorizing soybean material. J. Friedman, C.A. 9:1643  
A process for decorticating, grinding, heating beans in dry heat with continuous stirring to carry off the moisture and flavor.
- 179,776 April 1, 1921. Treating soybeans. Y. Yamamoto and I. Mizusawa. C.A. 16:3371  
Beans are coarsely ground, treated with acetic acid, washed and dried. Oil is expressed.

- 367,082 February 18, 1932. Treating soybeans and similar leguminous seed.  
Fritz Güssel. C.A. 27:4332  
The beans are treated with oil to prevent oxidation when heated to improve the flavor.  
After the heat treatment the excess oil is removed by centrifuging.
- 367,865 February 25, 1932. A process for preventing the oxidation of soybeans and bran obtained therefrom.  
Landislaus Berczeller.
- 385,657 January 5, 1933. Process for disembittering and improving soybeans or like legumines.  
E. C. Winkler and H. Goller. C.A. 27:4600  
Similar to U. S. Patent 1,936,381; also see French Patent 727,771.
- 393,146 June 1, 1933. An improved process for treating soybeans.  
Landislaus Berczeller. C.A. 27:6001  
Beans are subjected to the alternate action of steaming and drying.
- 397,482 August 21, 1933. Treating soybeans.  
M. Bonotto. C.A. 28:1116  
Beans are placed in an SO<sub>2</sub> solution until saturated with the gas, then heated moderately to expel the SO<sub>2</sub>.
- 397,692 August 31, 1933. Soybean flour.  
W. L. Shellabarger, assignor to Shellabarger Grain Products Company.  
See U. S. Patent 1,867,541.
- 407,866 March 29, 1934. Improvements relating to the process of producing soya flour.  
E. Neufeld and Hugo Heymann. C.A. 28:5551  
Soybeans are soaked in slightly acidulated water at an elevated temperature but not above 75° C. Next the beans are washed several times with water, ground and roasted with periodical interruptions of the heat supply.
- 452,682 August 27, 1936. Treating animal and vegetable materials.  
Willey Ekhard. C.A. 31:1155.
- 510,375 August 1, 1939. Soybean flour.  
British Arkady Co. Ltd. and Alan M. Maiden. C.A. 34:5195  
The objectionable flavor is removed by heating the flour between 90° to 150° F. and maintaining it at this temperature without reducing its moisture content below 4 percent until the flavor is removed. The flour may be treated wholly or in part with ammonia prior to or during the heat treatment.



- 517,997 February 14, 1940. Improvement in or relating to the treatment of soybeans.  
William J. Plews. C.A. 35:7054  
Soybeans are heated with steam to a high pressure; the pressure is suddenly reduced causing removal of the hulls.

FRENCH PATENTS

- 708,394 March 28, 1931. Process of treating soybeans for food purposes.  
Fritz Gossel.
- 727,771 June 24, 1932. Removing the bitter principles from soybeans.  
E. C. Winckler and Hubert Goller.  
C.A. 26:5675  
The bitter principle is removed by diffusion with water.
- 728,594 December 1, 1931. Vegetable materials.  
Soya Products, Inc. C.A. 26:6034  
Soybeans are treated with sulfur dioxide and then washed in an aqueous solution to remove the acid and colored substances.
- 740,470 January 26, 1933. Process for manufacture of soy flour with improved taste.  
M. M. Cohn.
- 742,986 March 21, 1933. Vegetable products.  
Ladislaus Berczeller. C.A. 27:3760  
Products are submitted alternately to the action of steam and partial drying.
- 745,299 May 8, 1933. Process for manufacture of soy flour.  
Shellabarger Grain Products Company.  
C.A. 27:4321
- 841,296 May 15, 1939. Improvement in the preparation of soybeans.  
A. A. Horvath.

GERMAN PATENTS

- 31,391 July 10, 1886. Process for debittering legumes and other seeds.  
Paul Saltsien.  
The bitter materials are removed from seeds by treatment with aqueous or alcoholic solutions containing 6 to 10 percent of ammonia.
- 406,170 November 15, 1924. Process for treatment of soybeans for food purposes.  
Ladislaus Berczeller in Vienna and Robert Graham in Cupra-Fife, Haymount, Schottf.

- 536,178 October 17, 1931. Preparation of protein-rich baked products.  
Friedrich Passek.
- 542,302 June 18, 1930. Working up lupines and other legumes.  
Otto C. Strecker. C.A. 26:2255.
- 626,405 February 26, 1936. Process for debittering and improving  
soybeans or similar legumes.  
Carl Winkler. C.A. 30:3539  
See French Patent 727,771. C.A. 26:5675
- 644,673 May 10, 1937. Process for the manufacture of soybean flour.  
Shellabarger Grain Products Company.
- 670,679 January 21, 1939. Improving soybeans.  
C.A. 33:6470
- 713,621 October 16, 1941. Soybean flour.  
Richard Hempel. C.A. 38:1811  
Soybeans are treated with acidulated water at 70° to 75° C.,  
then dried and ground.

#### SWISS PATENTS

- 121,554 January 30, 1926. Soybean and soybean meal as human food.  
Otto Czadek.
- 172,720 January 16, 1935. Improving soybeans.  
Ernst Lieberherr. C.A. 29:5539  
Leguminous seeds are heated without oxidation to break down  
the glucoside substances they contain. The heating is  
carried out by heating the seed in oil or fat.

#### AUSTRIAN PATENTS

- 106,346 April 25, 1927. Process for improving soybeans.  
Ladislaus Berczeller.
- 124,999 July 15, 1929. Working up soybeans.  
Ladislaus Berczeller. C.A. 26:785  
The deoiled soybeans are treated with steam.
- 126,155 August 15, 1931. Treatment of soybeans to remove beany  
flavor.  
Hubert Goller and E. C. Winkler. C.A. 26:2255  
Beans are treated with water at 65° to 75° C. at raised  
or reduced pressure to remove bitter constituents and  
carbohydrates.

JAPANESE PATENTS

34,949      September 15, 1919. Deodorized and bleached soybean flour.  
Y. Yamamoto, I. Mizusawa, and T. Kano.

Printed copies of U. S. patents are furnished by the Patent Office, Washington, D. C., at 10 cents each. Photostatic copies of foreign patents may be obtained at 20 cents per page. In ordering foreign patents, the year as well as the number must be furnished the patent office.

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